

Original Communication

## Acute poisoning at two hospitals in Kampala–Uganda

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### Abstract

**Background:** The aim of this study was to characterize acute poisoning cases admitted to two hospitals in Kampala, Uganda.

**Study design:** All cases admitted to the two hospitals, from January 2005 to June 2005, were evaluated retrospectively. Data obtained from the hospital medical records included the following: demographic characteristics, toxic agents, length of stay, circumstances of poisoning, and mortality information on the victims.

**Results:** Of the total 276 patients admitted for treatment, whose mean age was 26.6 ( $\pm 12.2$ ) years, 71.0 % were males. The age category of 20–29 years old most affected (42.8%), while only 5.1% of those affected were younger than 13 years old. Toxic agents involved in the incidents were, in descending order, agrochemicals (42.4%), household chemicals (22.1%), carbon monoxide (20.0%), snakebites (14.1%), and food poisoning (1.4%). There was a statistically significant difference with regard to gender, females were more victims of poisoning by snake bites (25.0% vs. 9.7%) and food poisoning (2.5% vs. 1.0%), while males were more affected by carbon monoxide (25.5% vs. 6.3%). Moreover, 61.2% patients spent less than 2 days in hospital, the mean length of stay was 2.1 days, with a range of 1 to 26 days. The overall case fatality rate was 1.4%; of those who died, 75% were males, and the toxic agents responsible for the death were alcohol (50%), carbon monoxide (25%), and organophosphate (25%).

**Conclusion:** Acute poisoning involved more men, who spent more than 2 days being hospitalized, and resulted in a case fatality rate of 1.4% due to alcohol, carbon monoxide, and organophosphates. These findings suggest that further studies are warranted in order to understand the motivation(s) for this emerging problem, and plan appropriate interventions.

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**Keywords:** Acute poisoning; Fatality rate; Uganda

### Introduction

Acute poisoning is a cause of both morbidity and mortality in many parts of the world. The toxic agents associated with the morbidity and mortality varies from place to place, and over time, due to their availability and use. For instance, in South Africa, recent reports suggest that acute poisoning is responsible for up to 17% of total ward admissions in children.<sup>1,2</sup> It is generally known that children under 10 years represent up to 80% of all victims of poisoning, and the majority of these poisoning incidents are unintentional.<sup>3,4</sup> It is also known

that more males than female children are victims of poisoning.<sup>5–7</sup> Although mortality from acute poisoning is reportedly low, it is usually high in patients who are victims of suicide.<sup>8–10</sup> Kiyanda et al. reported that pesticides and medications, mainly antimalarials and diazepam, were the toxic agents mostly used for deliberate poisoning among participants interviewed in Kampala.<sup>11</sup> It is important to distinguish between deaths due to accidental and deliberate poisoning. Against this background, present study was undertaken in order to characterize acute poisoning cases admitted to two hospitals in Kampala during the first half of 2005. The objectives of this study were to determine the common toxic agents involved in poisoning, length of hospital stay, to compare outcomes with regard to gender and the case fatality rate of the acute poisoning cases.

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## Materials and methods

A review was conducted of 276 cases of acute poisoning admitted to two hospitals situated in Kampala, Uganda. These two hospitals were chosen because they serve large populations and treat cases referred by other district hospitals. The two hospitals were located in Kampala, Uganda. Two students Master of Public Health students from the University of Limpopo (Medunsa Campus) collected using a pre-tested data collection form from records of patients admitted between January and June 2005. All recorded cases of poisoning during the study period were included in the study. Data obtained included age, gender, toxic agents, length of stay, circumstances of poisoning, and whether these poisoned patients had survived or died as a result of the poisoning. All patients with a diagnosis of poisoning were included. Toxic agents involved were classified based on their characteristics. The information regarding the circumstances of the poisoning incident was obtained from the patients' files. One data collector per facility collated the data. Two data capturers entered data into datasheet and the analysis was performed using SPSS version 13. Descriptive statistics were used to describe the sample and *p*-values less than or equal to 0.05 were considered to be statistically significant. The statistical test for comparison used was the Chi-square test.<sup>11</sup> This test was performed to compare actual frequency counts against the null hypothesis for bivariate tabular analyses. Ethics approval for the study was obtained from the Research Ethics and Publications Committee of the Faculty of Medicine, University of Limpopo-Medunsa Campus.

## Results

In this study, the majority of victims of acute poisoning were male, all black Africans, whose median age was 26.6 years ( $\pm 12.2$ ), ranging from 0.3 to 75 years. The age group 20–29 years was the mostly affected. Agrochemicals, notably, organophosphates were the most commonly implicated toxic agents, followed by household chemicals such as acetone, alcohol, methanol, various acids, and unspecified chemicals; carbon monoxide resulting from polyester fumes, snake bites, and food poisoning were also involved as shown in Table 1. The majority of poisoning occurred accidentally, and deliberate poisoning was equally prevalent in females (36.3%) and males (35.2%). Regarding the length of hospital stay (Table 2), 79.7% of the victims stayed for less than 2 days, while the mean length of stay being 2.1 ( $\pm 3.0$ ) days. The overall case fatality rate was 1.4%. Of those who died (Table 3), 75% were males, 50% over 30 years old, 25% aged, respectively, 13–19 and 20–29 years old; and the toxic agents responsible for the death were alcohol (50%), carbon monoxide (25%), and organophosphate (25%). Half of the deaths were due to suicide.

Table 1  
Frequencies of study variables (*n* = 276)

Variables	Percent
<i>Age category</i>	
• <6years	2.5
• 6–12years	2.2
• 13–19years	22.1
• 20–29years	42.8
• 30 or more years	30.4
<i>Gender</i>	
• Male	71.0
• Female	29.0
<i>Circumstances</i>	
• Unintentional	64.5
• Deliberate	35.5
<i>Toxic agents</i>	
• Agrochemicals	42.4
• Household chemicals	22.1
• Carbon monoxide	20.0
• Snake bites	14.1
• Food poisoning	1.4
<i>Outcome</i>	
• Survived	98.6
• Died	1.4

Table 2  
Age and length of hospital stay (LOS) parameters

Parameters	Age in years ( <i>n</i> = 276)	LOS in days ( <i>n</i> = 212)
Mean	26.6	2.1
Median	24.0	1.0
Minimum	0.3	1.0
Maximum	75.0	26.0
Mode	20.0	1.0

Table 3  
Frequencies of study variables by fatal outcome (*n* = 4)

Variables	Percent
<i>Age category</i>	
• <6years	0.0
• 6–12years	0.0
• 13–19years	25.0
• 20–29years	25.0
• 30 or more years	50.0
<i>Gender</i>	
• Male	75.0
• Female	25.0
<i>Circumstances</i>	
• Unintentional	50.0
• Deliberate	50.0
<i>Toxic agents</i>	
• Agrochemicals	25.0
• Household chemicals	50.0
• Carbon monoxide	25.0
• Snake bites	0.0
• Food poisoning	0.0

## Discussion

The majority of those poisoned were male; whose median age was 24 years. This demographic distribution

of poisoning cases is consistent with previously reported findings in which males in the age group of 20–24 years old were the most affected by deliberate acute poisoning.<sup>11</sup> As reported by other investigators, the reasons for this situation include hopelessness, psychological distress, and anger.<sup>12</sup>

In this study, the majority of poisoning cases were accidental but 50% of deaths occurred among those who committed suicide. This finding is inconsistent with those reported in the literature since the case fatality rate is usually higher in case of deliberate poisoning.<sup>10,14</sup> However the case fatality rate reported in this study is lower when compared to reports by other investigators.<sup>15</sup> Although this study did not assess the factors associated with the low fatality, it is known that in case of acute poisoning, factors such as the intrinsic toxicity of the poisoning agent, and the dose consumed play an important role.<sup>16,8</sup>

Despite the low case fatality rate, the health expenditure associated with the treatment of victims may be substantial even though the majority of victims spent less than two days in the hospital. Moreover, the fact that two of the four deaths were due to alcohol underscores the fact that alcohol related mortality and morbidity presents a significant public health problem that needs to be addressed.<sup>17</sup> Agrochemicals continue to be the leading chemical group involved in both deliberate and unintentional poisoning due to their widespread availability and lack of proper control to their accessibility.<sup>1</sup> The finding that snakebites were reported in more than 10% of victims of poisoning is consistent with reports from other countries such as South Africa, where snake envenomation is also associated with low or non-fatal outcomes.<sup>13,18</sup>

The findings of this study have several important implications. Firstly, it is crucial to understand the motivation(s) and circumstances of those involved in acute poisonings before interventions could be designed to address the problem. These interventions should be multi-dimensional involving educational, regulatory, and managerial approaches. Media and public education on the topic of acute poisoning is warranted, and all primary health care practitioners namely community health workers, health promoters, general practitioners, nurses, as well as pharmacists, need to be involved.

Secondly, legal approaches should include the enforcement of the existing legislation relating to the control of pesticides and medicines. One practical regulatory approach should include measures aimed at strengthening the ethical responsibilities of farmers, storekeepers, pharmacists, dispensing doctors, and nurses regarding the need of advising their workers and patients on the safe use and storage of pesticides, other chemicals, and medicines bought over-the-counter or dispensed by them. Another set of intervention aimed at educating the public on precautionary measures to avoid animal bites including snakebites, and developing relevant programs aimed at facilitating sensible alcohol consumption among drinkers to prevent related intoxications as found in this study.<sup>17</sup>

Finally, this study has some limitations. These are the reliance on patient declarations without any toxicological analysis; as well as the inability to establish cause and effect relationships due to the design of the study. In addition, since only two facilities were included in the study, they cannot be regarded as representative of all hospitals in Kampala. Another limitation results from the lack of official statistics about injury, particularly, acute poisoning in Uganda. Nevertheless, the findings provide information on the spectrum of acute poisoning, and common causes of mortality due to the phenomenon as seen in the facilities studied. In summary, acute poisoning involved more men, who spent more than 2 days being hospitalized, and resulted in a case fatality rate of 1.4% due to alcohol, carbon monoxide, and organophosphates. These findings suggest that further studies are warranted in order to understand the motivation(s) for the growing problem of suicide deaths, and plan appropriate interventions.

### Conflict of Interest Statement

None.

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